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10/084,320	02/28/2002	Joe Cargnelli	9351-95	1996

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EXAMINER	
FORD, JOHN K	

ART UNIT	PAPER NUMBER
3753	

DATE MAILED: 11/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/084,320	CARGNELLI ET AL.	
	Examiner	Art Unit	
	John K. Ford	3753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 9/15/05 + 8/30/05.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☑ Claim(s) 1,4,5,7-9,11,12 and 17-22 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☑ Claim(s) 1,4,5,7-9,11,12 and 17-22 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Applicant's response of August 30, 2005 has been given careful consideration. As well the supplemental response of September 12, 2005 has been given careful consideration.

PROPOSED DRAWING CHANGES CONSTITUTE NEW MATTER

Starting with the drawing changes, the proposed drawing corrections to Figure 7 received September 12, 2005 and August 30, 2005 are NOT approved. There is clearly new matter being entered into the disclosure. Most notably the heat exchanger (newly legended 134a) immediately below heat exchanger 118a in originally filed Figure 7 (originally filed drawing is dated 02/28/02) now has a plurality of fluid connections associated with it that are not supported by the original specification, claims or drawings. The fact that the systems in the upper and lower portions of Figure 7 are disclosed as similar on page 9, lines 8-12 of the originally filed specification (note the term "many" and not "all" being used to describe the correspondence of the elements between the upper and lower portions of Figure 7) does not permit applicant to engage in wholesale reconstruction of drawing Figure 7 to support what is newly claimed (namely some sort of common coolant supply for the first and third heat exchangers and a second common coolant supply for the second and fourth heat exchangers). These new claim limitations added to claim 1 can only be derived from either of the proposed amended Figure 7 submission of August 30, 2005 or September 12, 2005, and both of those submissions are denied entry here because of new matter.

112 First Paragraph

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 4, 5, 7-9, 11, 12 and 17-22 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Applicant asserts that heat exchangers 118 and 126 are arranged to be provided with a common coolant". This appears to be inaccurate because the common coolant that applicant appears to be claiming is circulated through heat exchanger 134 and 164, not heat exchangers 118 and 126. There is no common coolant circulated through heat exchangers 118 and 126, each has its own independent fluid loop.

One loop circulates a fluid between heat exchangers 118 and 134 and the other loop (designated 162) circulates another entirely independent fluid between heat exchanger 126 and heat exchanger 164. In short, there is no common coolant between heat exchangers 118 and 126.

Moreover on page 9, lines 8-12, it states that **many** of the elements of these two lines 90 and 92 are common. It clearly **does not** state that **all** the elements of the two lines 90 and 92 are common. It is very clear that much of the detail shown in the bottom

half of Figure 7 is not identical to that shown in the top half, notwithstanding applicant's remarks to the contrary. These differences, coupled with the fact applicant explicitly states that not all the elements between the upper and lower parts of Figure 7 are identical, coupled with the fact that there is no supply conduit shown at the bottom in Figure 7 render the currently claimed subject matter unsupported by the original disclosure. Indeed the valve (not legended) at the far left side of the lowest portion of Figure 7 appears to be controlled in a completely different way based on the lines connected to it at the valve actuator than a similar valve (148) at the top of Figure 7.

Therefore it cannot be stated with any reasonable assurance that applicant was in possession of the subject matter (namely the common coolant supply for heat exchangers 118 and 126 and 118a and 126a) claimed at the time of invention. There are too many ambiguities in Figure 7 and the description thereof for one of ordinary skill to assume that pipes 144 and 146 and unillustrated pipes (that applicant has attempted to add in the form of 144a and 146a, denied entry as containing new matter); if they even exist, were plumbed to a common source of coolant for heat exchangers 118a and 126a. Finally, even if one were to assume everything that counsel has stated is true, there is no common coolant through heat exchangers 118 and 126 as well as 118a and 126a. These heat exchangers clearly are associated with separate cooling loops, each containing its own intermediate fluid, in the case of heat exchangers 118 and 126.

35 USC 112, Second Paragraph

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 4, 5, 7-9, 11, 12 and 17-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, it states that the excess heat from the first and third heat exchangers is removed with the common coolant supply. This is not true. The heat from the first heat exchanger (118) is removed by an intermediate fluid (circulated by pump 136) and then transfers that heat to a further heat exchanger (134) that is cooled by a "common coolant" circulated between further heat exchanger (134) and yet another further heat exchanger 164 (the latter connected to cool another intermediate fluid in circuit 162 circulating between heat exchanger 164 and third heat exchanger 126). It is deemed mis-descriptive to claim in claim 1 that first and third heat exchangers (118 and 126) are cooled by a common coolant when they are in fact **each cooled by a separate coolant** that are, in turn, cooled by a common coolant in a separate set of heat exchangers (134 and 164).

35 USC 103

The following is a quotation of 35 U.S.C 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary

skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 7 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combined teaching of JP 9-35737, JP 5-256468 and Weitman.

JP 9-35737 teaches two humidifiers 2A and 2B properly conditioning fuel gas and oxidizer before entering a fuel cell. In the case of cells it is known to have two humidifiers, one for the oxidizing gas (i.e. 2A of JP 9-35737) and one for the fuel gas, (i.e. 2B of JP 35737). To have used two of the systems for delivering precise humidity and temperature to condition fuel gas and oxidizer to a fuel cell would have been obvious from the teachings of JP 9-35737 since it is apparently necessary to insure optimal operational efficiency. No details are shown in the aforementioned reference of the particulars of humidifiers 2A and 2B.

JP '468 teaches a steam source 24 connected to a mixing chamber 20 for mixing the injected steam with incoming process gas from compressor 23. The highly saturated process gas is subsequently cooled below its dew point by cooler 25 and a separator 28 discharges condensate. A heater 31 subsequently is used to heat the process stream to a desired temperature. One additional refinement of JP '468 is the use of a humidity controller 30 (controlled by a dew-point instrument 29) downstream of the saturating cooler 25. In view of the teaching of Weitman, which shows a saturator followed by a reheater and which lacks the refinement discussed above (i.e. the use of a humidity controller 30 controlled by a dew-point instrument 29), it would have been obvious to have omitted the dew point instrument 29 and controller 30 in JP '468 to

attain a less expensive structure. In general the omission of an element and its associated function is not deemed to be patentable, see In re Karlson, 136 USPQ 184.

Alternatively, to have replaced saturator unit 1 of Weitman with units 20, 24 and 25, 27 and 28 of JP '468, which perform the same function, would have been obvious to reduce the overall size of the saturation section, and advantageously permit high temperature saturation to take place.

In view of JP '737 it would have been obvious to have duplicated the aforementioned JP '468/Weitman system for as many humidifier process streams as desired, which in the case of fuel cells, is two, one for the fuel gas and one for the oxidizer.

Applicant concedes that JP 9-35737 shows separate humidifiers 2A and 2B for the fuel and oxidizer of a fuel cell, which is all that it was cited to teach. Applicant then asserts without supporting logic or reasoning that the humidification "would seem to be somewhat arbitrary" and now that it fails to provide "reliable and controlled levels of humidification" in this reference. Again, the Examiner does not see any evidence to support these speculations. In fact it appears to be contrary to conventional knowledge in the fuel cell field as evidenced by Fleck (USP 5,432,020), which discloses (Abstract, second sentence) – "To ensure high efficiency, the process gas must be introduced at a predetermined temperature and humidity". Fleck forms no part of the rejection and is relied upon purely to rebut applicant's argument that the humidification in JP '737 is a somewhat arbitrary. If that were the case, it is submitted that the fuel cell would not operate in a highly efficient manner without reliable and controlled humidification, which

is contrary to the goals of fuel cell technology and the simple logic that fuel cell designers do not normally go about designing poorly performing fuel cells. Applivccant now argues that Fleck isn't enough evidence to cure applicant's speculation about some perceived deficiency in JP '737. The examiner is unwilling to sink the level of ordinary skill in the art any further by responding to speculative arguments about what constitutes proof that fuel cells require reliable and controlled humidification for maximum efficiency. Applicant has already admitted as much in the prosecution of SN 09/628,929 and the examiner is not ready to entertain retractions here.

Applicant then asserts, again without supporting reasoning, that JP 5-256468 and Weitman are non-analogous art. Both JP '468 and Weitman are concerned with controlling the humidity and temperature of air to a specific degree. Since the oxidizer in fuel cells is typically air, the Examiner disagrees with applicant's conclusion that JP '468 and Weitman constitute non-analogous art. The problem of simultaneously controlling temperature and humidity in a gas and more specifically in air is a concern in both fuel cells (as evidenced by Fleck) and in other process controllers (JP '468 and Weitman). Moreover, applicant's unsubstantiated allegations that there is no need for accurate control of humidity and temperature in a semiconductor processing facility is not agreed with. Regarding the "abrupt change" argument, it is noted that none of the claims specify any particular response time to change. Thus, the argument is incommensurate with the scope of the claims. Moreover applicant's own disclosure measures response time in terms of minutes (not seconds) suggesting that his own device is fairly slow to respond.

Regarding the physical incorporation argument, applicant is correct to note that humidifiers 2A and 2B of JP '737 are compact, but as applicant has also noted there is no necessary degree of compactness specified in the claims, applicant's own system is very large and in a test station for fuel cells such as applicant has designed and disclosed here, there is no requirement for small size.

Regarding the fact that the abstract of JP '468 uses the terms "water-vapor generator" to describe element 24, it is submitted that this is the same thing as a steam source as evidenced by the more detailed translation of the entire document that was provided to applicant.

Claims 1, 7-9 and 17-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combined teachings of JP 5-256468, Weitman, Getchel et al (USP 6,415,858), and either Fleck and/or applicant's admitted prior art.

JP' 468 teaches a stream source 24 connected to a mixing chamber 20 for mixing the injection steam with incoming process gas for compressor 23. This highly saturated process gas is subsequently cooled below its dew-point by cooler 25 and a separator 28 discharges condensate. A heater 31 subsequently is used to heat the process stream to a desired temperature. One additional refinement of JP' 468 is the use of a humidity controller 30 (controlled by a dew-point instrument 29) downstream of the saturating cooler 25. In view of the teaching of Weitman, which shows a saturator followed by a reheater and which lacks the refinement discussed above (i.e. the use of

a humidity controller 30 by a dew-point instrument 29), it would have been obvious to have omitted the dew-point instrument 29 and controller 30 in JP' 468 to attain a less expensive structure. In general, the omission of an element and its associated function is not deemed to be patentable, In re Karlson, 136 USPQ 184.

Alternatively, to have replaced saturator unit 1 of Weitman with units 20, 24 and 25, 27 & 28 of JP' 468, which perform the same function, would have been obvious to reduce the overall size of the saturation section, and advantageously permit high temperature saturation to take place (i.e. by the use of steam).

Regarding the step of providing a gas of controlled humidity and temperature to a fuel cell, it is submitted that it is well known in the art of fuel cells to control temperature and humidity of the process gas (typically air) to a predetermined level to assure maximum efficiency as taught by Fleck. Fleck also teaches that where the system is exposed to freezing temperatures it can be provided with "suitable insulating measures or by a heating system." (col. 3, lines 28-34). To have insulated all of the conduits in Weitman/JP' 468 to prevent freezing problems when using them to supply the process air of controlled temperature and humidity to a fuel cell would have been obvious to one of ordinary skill.

Likewise, Applicant also admits in his remarks in SN 09/628,929 of July 20, 2004, page 8, that fuel cells must be precisely conditioned to operate properly. With regard to fuel cells applicant admits that they need precisely controlled temperature and humidities to operate properly (SN 09/628,929, July 20, 2004 remarks, page 8):

"It is commonly necessary for the temperature and humidity conditions to be very tightly controlled, since small variations in temperature and humidity can adversely affect fuel cell performance; more importantly, improper temperature and humidity conditions can result in damage to the fuel cell and/or to flooding leading to a drastic reduction in performance."

In view of either Fleck and/or applicant's own admissions, it would have been obvious to have used the JP' 468/Weitman combined prior art to condition a fuel cell because both JP' 468 and Weitman are concerned with generating precisely controlled temperatures and humidities in process fluids. Admittedly, neither JP' 468 nor Weitman explicitly contemplate bringing the precisely regulated process gas to a fuel cell, but Fleck and applicant have, respectively, disclosed and admitted that fuel cells need precisely controlled temperatures and humidities in the process fluids (e.g. air and gaseous fuel) to function properly.

Against this reality, applicant argues in the July 20, 2004 response in SN 09/628,929 that there is some fundamental difference between precisely controlling humidity and temperature in gas (air) delivered to a clean room versus the gas (air) delivered to a fuel cell. The Examiner disagrees. There is no difference. Both systems need precisely controlled temperatures and humidities, applicant's remark to the contrary notwithstanding. Moreover, the speed at which the system responds to changes in temperature and humidity simply isn't an issue given that none of the applicant's claims set any limitation on this performance criterion. Moreover, the arguments about "dead volumes" is simply incommensurate with the scope of the

claims given that no limits are set on "dead volume" in any of applicant's claims. The fact that saturating air with water vapor and then cooling it below its dew-point inherently cleans the air is not a reason to reject the teachings of the prior art since applicant's system will inherently do the same thing assuming the oxidizer or fuel gas is contaminated with any sort of particulate matter, that any upstream filters have been unable to isolate and trap.

Finally, regarding the "common coolant" limitation in claim 1, it is clear from Getchel et al (USP 6,415,858) that precision temperature control equipment often uses a common coolant (see return pipe 116) in a thermal conditioning unit (110) that includes a cooler (134 and/or 135) and separately heated outputs 112 and 114 connected to two parts of a thermal conditioning machine requiring different temperatures. To have used such a "common coolant" type of conditioning machine to supply appropriate temperature coolant to inlet pipes 3 and 9 of Weitman (or corresponding first and second heat exchangers in the other prior art) would have been obvious to avoid the extra cost of providing two separate cooling systems.

Claims 4 and 5 are rejected under 35 U.S.C. 130(a) as being unpatentable over any of the prior art as applied to claim 1 above, and further in view of Ebbing et al (5,544,275) or Othmer (3,617,699).

Heaters for long delivery pipes where significant temperature drops occur are well know to prevent the condensation of gas components. To have used either of the

heaters of Ebbing or Othmer in the outlet line of the prior art to keep the outlet line from experiencing condensation would have been obvious.

Claims 8, 9, and 17-21 are rejected under 35 U.S.C. 130(a) as being unpatentable over any of the prior art as applied to claim 7 above, and further in view of Oswalt et al (4,769,998).

Oswalt teaches a combined heater/chiller to achieve particularly high levels of regulation. To have substituted this type of chilled fluid source in place of the chilled fluid source shown in the prior art (i.e. element 27 in JP '468 or the unillustrated chilled fluid source connection to inlet 3 and 4 of Weitman) would have been obvious to one of ordinary skill.

Claims 11 and 12 are rejected under 35 U.S.C. 130(a) as being unpatentable over the prior art as applied to claim 10 above, and further in view of Gunter USP 3,671,273.

Gunter teaches a shut-off valve (71), trap (74 or 68), pressure regulators 96 and non-return valve 64 as conventional components of a steam handling system. To have added such components to the steam source of the prior art to regulate it in conventional manner would have been obvious to permit the operator to controllably operate the steam source.

Regarding claim 12 to have duplicated the shut-off valve (71), pressure regulator (96) and non-return valve (64) for each of the humidifier for the fuel gas and oxidizer of

the fuel cell would have been obvious from the teaching of JP 9-35737 which shows separate humidifiers for each of the fuel gas and oxidizer streams.

Any inquiry concerning this communication should be directed to John K. Ford at telephone number 571-272-4911.

John K. Ford
Primary Examiner